Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

General

Title

Heart failure (HF): hospital-level, risk-standardized payment associated with a 30-day episode of care for HF.

Source(s)

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 measure updates and specifications report: hospital-level risk-standardized payment measures. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017 Mar. 94 p.

Measure Domain

Primary Measure Domain

Related Health Care Delivery Measures: Cost

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

The measure estimates hospital-level, risk standardized payment (RSP) for a heart failure (HF) episode of care starting with inpatient admission to a short term acute-care hospital and extending 30 days post-admission for Medicare Fee-for-Service (FFS) patients discharged from the hospital with a principal discharge diagnosis of HF.

The Centers for Medicare & Medicaid Services (CMS) annually reports the measure for individuals who are 65 years and older and are Medicare Fee-for-Service (FFS) beneficiaries hospitalized in non-federal short-term acute care hospitals (including Indian Health Services hospitals) and critical access hospitals.

Rationale

In 2012 total Medicare expenditures were $574.2 billion, representing 3.6% of gross domestic product (GDP). Current estimates suggest that Medicare spending will increase to 5.6% of GDP by 2035 due to

both an increase in the Medicare population as well as Medicare spending on each beneficiary (The Boards of Trustees, Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, 2013). The growth in Medicare spending is unsustainable and highlights the need to create incentives for high value care. A critical first step in moving toward high value care is to define an approach to calculate costs that is transparent to consumers and fair to providers. This measure, using standardized payments, reflects differences in the management of care for patients with heart failure (HF) both during hospitalization and immediately post-discharge.

Payments, however, are difficult to interpret in isolation. Some high payment hospitals may have better clinical outcomes when compared with low payment hospitals; other high payment hospitals may not. In an effort to identify practice patterns that may be expensive without conferring a quality benefit, the HF payment measure specifications are aligned with current quality of care measures such as the Center for Medicare & Medicaid Services' (CMS's) 30-day HF risk-standardized mortality rate (RSMR). In this way the measure can facilitate the profiling of hospital value and encourage the most efficient delivery of high quality care.

A payment measure that fairly profiles hospitals by adjusting for hospital case-mix and standardizes payments for geography is congruent with national efforts to increase the transparency of our healthcare system. Although the HF payment measure is not intended to be used in payment programs, when interpreted in the context of CMS's 30-day HF RSMR, it can provide key insights into those systems of care that provide high value as a patient moves from the inpatient to the outpatient setting. Because the payment measure spans an episode of care, it is complementary to and may uniquely inform innovative payment models such as bundled payments and Accountable Care Organizations (ACOs), both of which seek to improve healthcare value by optimizing the coordination of care across care settings (CMS, 2013).

Heart failure is one of the leading causes of hospitalization for Americans 65 and over and costs roughly $34 billion annually (Russo & Elixhauser, 2006; Heidenreich et al., 2011). It is a common condition in the elderly with a substantial range in payments due to different practice patterns. Furthermore, because 30-day all-cause mortality and readmission measures for HF are already publicly reported, HF serves as a model condition for assessing relative value for an episode of care that begins with an acute hospitalization. By focusing on one specific condition, value assessments may provide actionable feedback to CMS and hospitals to incentivize targeted improvements in care.

Evidence for Rationale

Centers for Medicare & Medicaid Services (CMS). Bundled payments for Care Improvement (BPCI) Initiative fact sheet. [internet]. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2013 Aug

Heidenreich PA, Trogdon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, Finkelstein EA, Hong Y, Johnston SC, Khera A, Lloyd-Jones DM, Nelson SA, Nichol G, Orenstein D, Wilson PW, Woo YJ, American Heart Association Advocacy Coordinating Committee, Stroke Council, Council on Cardiovascular Radiology and Intervention, Council on Clinical Cardiology, Council on Epidemiology and Prevention, Council on Arteriosclerosis, Thrombosis and Vascular Biology, Council on Cardiopulmonary, Critical Care, Perioperative and Resuscitation, Council on Cardiovascular Nursing, Council on the Kidney in Cardiovascular Disease, Council on Cardiovascular Surgery and Anesthesia, and Interdisciplinary Council. Forecasting the future of cardiovascular disease in the United States: a policy statement from the American Heart Association. Circulation. 2011 Mar 1;123(8):933-44. PubMed

Russo CA, Elixhauser A. Hospitalizations in the elderly population, 2003. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 May. 8 p. (HCUP statistical brief; no. 6).

The Boards of Trustees, Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust. The 2013 annual report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2013. 274 p.

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research & Evaluation (CORE). Hospital-level, risk-standardized payment associated with a 30-day episode of care for heart failure (version 1.0): 2013 measure methodology report. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2013 Sep. 72 p. [20 references]

Primary Health Components

Heart failure (HF); 30-day episode of care payment

Denominator Description

The measure cohort includes acute inpatient admissions for Medicare Fee-for-Service (FFS) beneficiaries aged 65 years or older discharged from non-federal acute care hospitals and critical access hospitals, with a principal discharge diagnosis of heart failure (HF).

The risk-standardized payment (RSP) is calculated as the ratio of the "predicted" payment to the "expected" payment at a given hospital, multiplied by the national mean payment. For each hospital, the denominator is the payment expected based on the nation and the specific hospital's case mix.

See the related "Denominator Inclusions/Exclusions" field.

Note: This outcome measure does not have a traditional numerator and denominator like a core process measure; thus, this field is used to define the measure cohort.

See the *2017 Measure Updates and Specifications Report: Hospital-level Risk-standardized Payment Measures* for more details.

Numerator Description

The measure reports total payments associated with an episode of care for heart failure (HF).

The risk-standardized payment (RSP) is calculated as the ratio of the "predicted" payment to the "expected" payment at a given hospital, multiplied by the national mean payment. For each hospital, the numerator of the ratio is the payment predicted based on the specific hospital and its observed case mix.

See the related "Numerator Inclusions/Exclusions" field.

Note: This outcome measure does not have a traditional numerator and denominator like a core process measure; thus, this field is used to define the outcome.

See the *2017 Measures Updates and Specifications Report: Hospital-level Risk-standardized Payment Measures* for more details.

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

Heart failure (HF) is a common condition in the elderly with substantial variability in payments due to different practice patterns. Quality measures for HF such as 30-day HF risk-standardized mortality rate (RSMR) are already publicly reported. In the context of its publicly reported quality measures, HF is an ideal condition in which to assess payments for Medicare patients and relative hospital value. Therefore,

we created a measure of payments for a 30-day episode of care for HF that could be aligned with the Centers for Medicare & Medicaid's (CMS's) 30-day HF mortality and readmission measures. This will allow CMS to assess the value of care provided for these episodes.

A preliminary examination of the 30-day HF risk-standardized mortality and risk-standardized payment measures showed high quality care (as measured by RSMR) at higher and lower relative costs. This finding illustrated that quality care can be provided at relative lower costs and that efficiencies of care can be optimized for HF.

Evidence for Additional Information Supporting Need for the Measure

DeBuhr J. (Research Associate II, Yale University Center for Outcomes Research and Evaluation (CORE), New Haven, CT). Personal communication. 2017 Dec 12. 1 p.

Extent of Measure Testing

Assessment of Updated Models

The heart failure (HF) payment measure estimates hospital-specific episode-of-care risk-standardized payment (RSPs) using a hierarchical generalized linear model. Refer to Section 2 in the original measure documentation for a summary of the measure methodology and model risk-adjustment variables. Refer to prior methodology and technical reports for further details.

The Centers for Medicare & Medicaid Services (CMS) evaluated and validated the performance of the HF model using July 2013 to June 2016 data for the 2017 reporting period. They also evaluated the stability of the risk-adjustment model over the three-year measurement period by examining the model variable frequencies, model coefficients, and the performance of the risk-adjustment model in each year.

CMS assessed generalized linear model performance in terms of discriminant ability for each year of data and for the three-year combined period. Two summary statistics for assessing model performance were computed: the predictive ratio and a quasi-R^2. For a traditional linear model (that is, ordinary least squares regression), R^2 is interpreted as the amount of variation in the observed outcome that is explained by the predictor variables (patient-level risk factors). Generalized linear models, however, do not output an R^2 that is akin to the R^2 of a traditional linear model. A "quasi-R^2" was produced by regressing the total payment outcome on the predicted outcome. Specifically, CMS regressed the total payment on the payment predicted by the patient-level risk factors.

The results of these analyses are presented in Section 4.3 of the original measure documentation.

HF Payment 2017 Model Results

Frequency of HF Model Variables

CMS examined the change in the frequencies of clinical and demographic variables. Frequencies of model variables were stable over the measurement period. The largest changes in the frequencies (those greater than 2% absolute change) include increases in Other psychiatric disorders (20.3% to 22.7%), Respiratory arrest/cardiorespiratory failure/respirator dependence (27.8% to 31.2%), and Renal failure (61.1% to 63.3%).

HF Model Parameters and Performance

Table 4.3.2 in the original measure documentation shows hierarchical generalized linear regression model variable coefficients by individual year and for the combined three-year dataset. Table 4.3.3 in the original measure documentation shows the risk-adjusted payment ratios and 95% confidence intervals for the HF payment model by individual year and for the combined three-year dataset. The quasi-R^2 for the HF payment model was 0.03, suggesting that approximately 3% of the variation in payment can be

explained by patient-level risk factors. This quasi-R^2 is in line with R^2s from other patient-level risk-adjustment models for healthcare payment (Pope et al., 2011).

Overall, the variable effect sizes were relatively constant across years. In addition, model performance was stable over the three-year time period; the quasi-R^2 and predictive ratios remained similar to the model used for 2016 public reporting.

Refer to the original measure documentation for additional information.

Evidence for Extent of Measure Testing

Pope G, Kautter J, Ingber M, Freeman S, Sekar R, Newhard C. Evaluation of the CMS-HCC risk adjustment model: final report. Research Triangle Park (NC): RTI International; 2011 Mar. 119 p.

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 measure updates and specifications report: hospital-level risk-standardized payment measures. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017 Mar. 94 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Hospital Inpatient

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Single Health Care Delivery or Public Health Organizations

Statement of Acceptable Minimum Sample Size

Specified

Target Population Age

Age greater than or equal to 65 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Aim

Affordable Care

National Quality Strategy Priority

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Not within an IOM Care Need

IOM Domain

Not within an IOM Domain

Data Collection for the Measure

Case Finding Period

Discharges July 1, 2013 through June 30, 2016

Denominator Sampling Frame

Patients associated with provider

Denominator (Index) Event or Characteristic

Clinical Condition

Institutionalization

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions

An *index admission* is the hospitalization that begins the episode-of-care payment window and includes admissions for patients:

- Having a principal discharge diagnosis of heart failure (HF)*
- Enrolled in Medicare Fee-for-Service (FFS) Part A and Part B for the 12 months prior to the date of the admission, and enrolled in Part A and Part B during the index admission
- Aged 65 or over
- Not transferred from another acute care facility

*International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes used to define the HF cohort for discharges on or after October 1, 2015:

I11.0 Hypertensive heart disease with heart failure
I13.0 Hypertensive heart and chronic kidney disease with heart failure and stage 1 through stage 4 chronic kidney disease, or unspecified chronic kidney disease
I13.2 Hypertensive heart and chronic kidney disease with heart failure and with stage 5 chronic kidney disease, or end stage renal disease
I50.1 Left ventricular failure
I50.20 Unspecified systolic (congestive) heart failure
I50.21 Acute systolic (congestive) heart failure
I50.22 Chronic systolic (congestive) heart failure
I50.23 Acute on chronic systolic (congestive) heart failure
I50.30 Unspecified diastolic (congestive) heart failure
I50.31 Acute diastolic (congestive) heart failure
I50.32 Chronic diastolic (congestive) heart failure
I50.33 Acute on chronic diastolic (congestive) heart failure
I50.40 Unspecified combined systolic (congestive) and diastolic (congestive) heart failure
I50.41 Acute combined systolic (congestive) and diastolic (congestive) heart failure
I50.42 Chronic combined systolic (congestive) and diastolic (congestive) heart failure
I50.43 Acute on chronic combined systolic (congestive) and diastolic (congestive) heart failure
I50.9 Heart failure, unspecified

Note: International Classification of Diseases, Ninth Revision (ICD-9) code lists for discharges prior to October 1, 2015 can be found in the *2016 Measures Updates and Specifications Report: Hospital-level Risk-standardized Payment Measures* .

Exclusions

- Discharged alive on the day of admission or the following day who were not transferred to another acute care facility
- Inconsistent or unknown patient vital status or other unreliable demographic (age and gender) data
- Incomplete administrative data in the 30 days following the start of the index admission if discharged alive
- Enrolled in the Medicare hospice program any time in the 12 months prior to the index admission, including the first day of the index admission
- Discharged against medical advice
- Transferred to a federal hospital
- Not matched to admission in the HF mortality measure
- Missing index diagnosis-related group (DRG) weight where provider received no payment
- With a procedure code for left ventricular assist device (LVAD) implantation or heart transplantation either during the index admission or in the 12 months prior to the index admission

For patients with more than one eligible admission for HF in a single year, only one index admission for that condition is randomly selected for inclusion in the cohort. Additional admissions within that year are excluded.

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
The measure reports total payments associated with an episode of care for heart failure (HF).

The measure captures payments for Medicare patients across multiple care settings, services, and supplies (that is, inpatient, outpatient, skilled nursing facility [SNF], home health, hospice, physician/clinical laboratory/ambulance services, durable medical equipment, prosthetics/orthotics, and supplies).

The risk-standardized payment (RSP) is calculated as the ratio of the "predicted" payment to the "expected" payment at a given hospital, multiplied by the national mean payment. For each hospital, the numerator of the ratio is the payment predicted based on the specific hospital and its observed case mix.

Note: This outcome measure does not have a traditional numerator and denominator like a core process measure; thus, this field is used to define the outcome.

See the *2017 Measures Updates and Specifications Report: Hospital-level Risk-standardized Payment Measures* for more details.

Exclusions
Payment adjustments unrelated to clinical care decisions are not considered in the measure outcome

Numerator Search Strategy

Institutionalization

Data Source

Administrative clinical data

Type of Health State

Does not apply to this measure

Instruments Used and/or Associated with the Measure

None

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Ratio

Interpretation of Score

Does not apply to this measure (i.e., there is no pre-defined preference for the measure score)

Allowance for Patient or Population Factors

not defined yet

Description of Allowance for Patient or Population Factors

Risk-Adjustment Variables

In order to account for differences in case mix among hospitals, the measure adjusts for variables (for example, age, comorbid disease, and indicators of patient frailty) that are clinically relevant and have relationships with the outcome. For each patient, risk-adjustment variables are obtained from inpatient, outpatient, and physician Medicare administrative claims data extending 12 months prior to, and including, the index admission.

The measure adjusts for case mix differences among hospitals based on the clinical status of the patient at the time of the index admission. Accordingly, only comorbidities that convey information about the patient at that time or in the 12 months prior, and not complications that arise during the course of the hospitalization, are included in the risk adjustment.

The measure does not adjust for socioeconomic status (SES) because the association between SES and health outcomes can be due, in part, to differences in the quality of healthcare that groups of patients with varying SES receive. The intent is for the measure to adjust for patient demographic and clinical characteristics while illuminating important payment differences. As part of the National Quality Forum's (NQF's) endorsement process for this measure, the Centers for Medicare & Medicaid Services (CMS) completed analyses for the two-year Sociodemographic Trial Period. Although bivariate analyses found that the average total payments is higher for dual-eligible patients (for patients living in lower Agency for Healthcare Research and Quality [AHRQ] SES Index census block groups) and African-American patients compared with all other patients, analyses in the context of a multivariable model demonstrated that the effect size of these variables was small, and that the quasi-R^2 values for the models are similar with and without the addition of these variables.

Refer to Appendix D in the original measure documentation for the list of comorbidity risk-adjustment variables and list of complications that are excluded from risk adjustment if they occur only during the index admission.

Standard of Comparison

not defined yet

Identifying Information

Original Title

Hospital-level RSP associated with a 30-day episode of care for HF.

Measure Collection Name

National Hospital Inpatient Quality Measures

Measure Set Name

Payment Measures

Submitter

Centers for Medicare & Medicaid Services - Federal Government Agency [U.S.]

Developer

Centers for Medicare & Medicaid Services - Federal Government Agency [U.S.]

Yale-New Haven Health Services Corporation/Center for Outcomes Research and Evaluation under contract to Centers for Medicare & Medicaid Services - Academic Affiliated Research Institute

Funding Source(s)

Centers for Medicare & Medicaid Services (CMS)

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Financial Disclosures/Other Potential Conflicts of Interest

Unspecified

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2016 Nov 7

Measure Initiative(s)

Hospital Compare

Hospital Inpatient Quality Reporting Program

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2017 Mar

Measure Maintenance

Annual

Date of Next Anticipated Revision

2018 Apr

Measure Status

This is the current release of the measure.

This measure updates a previous version: Specifications manual for national hospital inpatient quality measures, version 5.0b. Centers for Medicare & Medicaid Services (CMS), The Joint Commission; Effective 2015 Oct 1. various p.

Measure Availability

Source available from the QualityNet Web site .

Check the QualityNet Web site regularly for the most recent version of the specifications manual and for the applicable dates of discharge.

Companion Documents

The following are available:

Hospital compare: a quality tool provided by Medicare. [internet]. Washington (DC): U.S. Department of Health and Human Services; [accessed 2017 Nov 10]. Available from the Medicare Web site .

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 Medicare hospital quality chartbook. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017. Available from the CMS Web site .

Yale New Haven Health Services Corporation (YNHHSC), Center for Outcomes Research and Evaluation (CORE). 2017 payment measures updates and specifications report: supplemental ICD-10 code lists for use with claims for discharges on or after October 1, 2015. Baltimore (MD): Centers for Medicare & Medicaid Services (CMS); 2017. Available from the QualityNet Web site .

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Copyright Statement

Production

Source(s)

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